



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,297	08/26/2003	Hyun Huh	47881-000003/US	2580
30593 7590 12/28/2006 HARNESSE, DICKY & PIERCE, P.L.C. P.O. BOX 8910 RESTON, VA 20195			EXAMINER VO, HAI	
			ART UNIT 1771	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE			MAIL DATE	
3 MONTHS			12/28/2006	
			DELIVERY MODE PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/647,297

Applicant(s)

HUH ET AL.

Examiner

Hai Vo

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 17-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Art Unit: 1771

1. The art rejections based on Miller et al (US 5,876,266) have been withdrawn in view of the present arguments. Miller discloses a polishing pad comprising a polishing layer composed of a polymeric matrix and **solid** microelements embedded in the polymeric matrix (column 9, lines 20-25). Miller does not teach liquid microelements as set forth in the claims.
2. The obviousness-type double patenting rejections have been overcome in view of the terminal disclaimer. U.S. Patent No. 7,029,747.

Terminal Disclaimer

3. The terminal disclaimer filed on 10/03/2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. Patent No. 7,029,747 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 5, 6, 9-13 and 16 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Molnar et al (US 6,267,644). Molnar discloses a polishing pad comprising a polishing layer composed of a polymeric matrix and finishing aids 27 substantially dispersed in the polymeric matrix as shown in figure 4. The finishing aids are selected from a group consisting of a lubricating aid and chemically reactive aid and both being free of an encapsulating film (column 40, lines 3-6). The lubricating aids include liquid and solid lubricants and mixtures thereof (column 24, lines 23-25). The liquid lubricants comprise silicon oils, aromatic mineral oils (column 24, lines 30-32; column 25, lines 12-15). The polymer matrix is made from polyurethane resin (column 11, lines 30-35). The polishing pad further comprises a polymeric lubricant such as polyethylene glycol which has a molecular weight of 200 to 2000 (column 24, lines 1-5). The polishing pad comprises a reinforcing layer which is integrally bonded to the finishing element finishing surface layer (column 10, lines 15-20). It appears that Molnar uses the same material to form the polishing pad as Applicants and both products serve the same purposes, therefore, it is not seen that the open pores with the same pore size, which are defined by the embedded liquid microelements could not have been formed across a surface of the polishing layer as like material has like property. The same token is applied to the semi-transparent property of the polishing layer. Accordingly, Mohnar anticipates or strongly suggests the claimed subject matter.
7. Claims 4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molnar et al (US 6,267,644) as applied to claim 1 above, in view of James et al (US

6,069,080). Molnar does not specifically disclose the amount of polyethylene glycol present in the polishing pad. James, however, teaches a polishing pad for use in the manufacture of semiconductor devices comprising a urethane matrix material that includes polyethylene glycol with a molecular weight of 200-10000 and present in an amount of 20 to 60% by weight of the matrix material (column 5, lines 50-55; and column 9, lines 1-5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to add polyethylene glycol in the urethane matrix material motivated by the desire to lower the modulus of the material, thereby making the phase more to wear, to dissolving or to otherwise diminishing during polishing.

Molnar does not specifically teach the polishing pad having a flow channel on the surface. James discloses the polishing pad having a flow channel on the surface (column 13, lines 20-40). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form a structure having a flow channel on the surface of the polishing layer motivated by the desire to facilitate removal of dross during polishing and enhance the polishing action by exposing a greater number of microelements.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Molnar et al (US 6,267,644) as applied to claim 1 above, in view of Merchant et al (US 6,364,744). Molnar teaches that the polishing pad comprises a reinforcing layer that is integrally bonded to the finishing element finishing surface layer (column 10, lines 15-20). This reads on Applicants' support layer which a seamless interface with the

polishing layer. Molnar does not teach a transparent reinforcing layer. Merchant, however, teaches a chemical mechanical polishing system comprising a support layer 25' and a polishing layer 24' attached to a top surface of the support layer as shown in figure 4. Merchant discloses the polishing layer and the support layer being transparent (column3, lines 48-50). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the transparent support layer motivated by the desire facilitate the light transmission through the polishing layer, thereby enhancing the photocatalytic process for breaking down water into hydrogen and oxygen in the presence of light. As a result, the released oxygen significantly enhances the oxidation of the metal surface during CMP.

9. Claims 8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molnar et al (US 6,267,644) as applied to claim 1 above, in view of Reinhardt et al (US 5,578,362). Molnar does not specifically teach a polishing pad comprising hollow polymeric microelements embedded in the polymeric matrix and open pores defined by the hollow polymeric microelements are also distributed across the surface of the polishing layer. Reinhardt, however, teaches a polymeric polishing pad comprising hollow polymeric microelements embedded in the polymeric matrix and open pores defined by the hollow polymeric microelements are also distributed across the surface of the polishing layer as shown in figure 3 (claim 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to embed the hollow polymeric microelements in the polymeric

matrix motivated by the desire to reduce the effective rigidity of the surrounding portion of the polymeric matrix, thereby providing at least two levels of hardness in the polishing pad, i.e., the work surface being softer than the subsurface (see Reinhardt, column 6, line 65 et seq.).

Molnar does not specifically teach the polishing pad having a flow channel on the surface. Reinhard discloses the polishing pad having a flow channel on the surface as shown in figures 7 and 8. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form a structure having a flow channel on the surface of the polishing layer motivated by the desire to facilitate removal of dross during polishing and enhance the polishing action by exposing a greater number of microelements (see Reinhardt, column 8, lines 65-67).

Applicants argue that Reinhard does not disclose hollow polymeric microelements. The examiner respectfully disagrees. Applicants' attention is directed to claim 1 of Reinhard.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Molnar et al (US 6,267,644) as applied to claim 1 above, in view of Bruxvoort et al (US 5,958,794). Molnar does not specifically disclose the lubricating oils having a content as recited by the claims. Bruxvoort, however, teaches a polishing pad for polishing wafer comprising 40% to 75% by weight of the plasticizer based on the total weight of the polymeric matrix (column 2, lines 65-67). Brixvoort discloses the plasticizer including silicone oils, and castor oils. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to

Art Unit: 1771

use the lubricating aids in an amount in the range instantly claimed motivated by the desire to provide cushioning effects during polishing, increase the erodability of the polishing pad and significant cost savings because plasticizer is typically less costly than the polymer matrix.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on Monday through Thursday, from 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hai Vo

HV

**HAIVO
PRIMARY EXAMINER**